Response ID:746 Data

1. BOSC 2017 Nominations

Self Nomination:

Yes

Nominator Information

First Name

Last Name

Nominator Title

Street Address

City

State

Postal Code

Email Address

Phone Number

Mobile Phone

Nominee Information

First Name

Elizabeth

Last Name

Boyer

Nominee Title

Associate Professor

Street Address

Exemption 6

Employment Information

Place of Employment/Work:

Penn State University

Work Street Address

304 Forest Resources Building

Work City

University Park

Work State:

PA

Work Postal Code

16802

Work Phone Number

814-865-8830

Work Email Address

ewb100@psu.edu

Sector

Academia

Qualifications

Primary Area(s) of Expertise

Research Program Evaluation
Systems Science/Systems Ecology
Aquatic/Systems Ecology (freshwater, wetland, estuary, near-coastal)
Nutrients (nutrient management/thresholds, best management practices, human/ecological health)
Water, Energy, and Food Nexxus
Watershed Management
Hydrological Sciences

Committee Preference(s)

Executive Committee
Safe and Sustainable Water Resources Subcommittee

Statement of Interest

I would be eager and honored to serve on the board of scientific counselors, helping EPA toward its mission and goals. I have broad training in the environmental and hydrological sciences; a strong record of research productivity; and substantial experience at facilitating interdisciplinary reserch (water, energy, food, environment) at major reserach universities. I understand the need to strive for environmental protection -- while at the same time considering econmic growth, uncertainty associated with rules and policies; and the roles of the federal government versus the states and others toward achieving goals. My interdisciplinary experience as a scientist allows me to provide unbiased advice and recommendations to EPA on technical and management issues of its research programs.

Skills/qualifications related to committee preference(s) specified

As a hydrologist, my research explores how natural and anthropogenic factors affect water -- in streams, lakes, aquifers, rivers, estuaries, and embayments. Understanding processes that affect status and trends of water quality remains a grand challenge; given the need to represent coupled elemental cycles within diverse landscapes, and to characterize spatial and temporal variability. I approach this from an interdisciplinary perspective, and have worked with over 300 collaborators from around the world on my publications about watersheds and water resources. My work contributes toward a scientific basis for management programs and policies to mitigate the effects of pollution; and to protect, conserve, and restore surface waters.

Other Relevant Information

I have provided advice to EPA previously, as an expert in the area of water resources, via various committees and subcommittes of the the EPA Clean Air Scientific Advisory Committee (CASAC); and the EPA Science Advisory Board (SAB), including:

1) CASAC Secondary National Ambient Air Quality Standards Review Panel for NOx and SOx (2015-present)
2) Advisory Council on Clean Air Compliance Analysis; Ecological Effects Sub-Committee (2004-2005). Review of the Revised Analytical Plan for EPA's Second Prospective Analysis – Benefits and Costs of the Clean Air Act 1990-2020
3) Advisory Council on Clean Air Compliance Analysis; Ecological Effects Sub-Committee (2010-2011): Review of the Second Prospective Study Report of the Benefits and Cost of the Clean Air Act, Section on Effects of Air Pollutants on Ecological Resources
4) SAB Ecological Processes and Effects Committee (2016-present)
5) SAB Integrated Nitrogen Committee (2006-2011)
6) SAB Ecological Processes and Effects Committee, Review of Nutrient Criteria Guidance (2009-2010)
7) SAB Mountaintop Mines and Valley Fill Review Panel and Field-Based Aquatic Life Benchmark for Conductivity Review Panel (2010-2011)
8) SAB Hydraulic Fracturing Study Plan Review Panel (2011-2012)
9) SAB Hydraulic Fracturing Research Advisory Panel (2013-2016)

CV/Resume URL

http://ecosystems.psu.edu/directory/ewb100

2. CV/Resume

Please upload your CV/ Resume.

Boyer_CV_web.pdf

3.

BOSC Nomination

Jul 01, 2017 00:05:07 Success: Email Sent to: tracy.tom@epa.gov

4. Thank You for your Submission!

Elizabeth W. Boyer, Ph.D.

Curriculum Vitae (web)

304 Forest Resources Building
Department of Ecosystem Science & Management
Penn State University, University Park, PA 16802
Email: ewb100@psu.edu, Phone: 814-865-8830

EXPERIENCE

Education

1998 PhD, Department of Environmental Sciences (option - hydrology), University of Virginia
1994 MS, Department of Environmental Sciences (option - hydrology), University of Virginia
1990 BS, Department of Geography (option - cartography, remote sensing, and GIS), w/ minor in Science, Technology & Society, Penn State University

Current Positions

2012-present, Associate Professor of Water Resources, Department of Ecosystem Science & Management, Penn State University
2008-present, Director, Pennsylvania Water Resources Research Center (one of 54 centers/institutes comprising the National Institutes of Water Resources)
2008-present, Assistant Director, Penn State Institutes of Energy & the Environment

Past Positions

2008-2012, Associate Professor (tenured), School of Forest Resources, Penn State University, University Park, PA
2007-2008, Associate Professor (tenured), Department of Environmental Science, Policy, and Management, University of California, Berkeley, CA
2006-2008, Affiliate Faculty Member, Energy & Resources Group, University of California, Berkeley, CA
2005-2007, Assistant Professor, Department of Environmental Science, Policy, and Management, University of California, Berkeley, CA
1999-2004, Assistant Professor, Department of Forest & Natural Resources Management, State University of New York, College of Environmental Science & Forestry, Syracuse, NY
2000-2004, Adjunct Assistant Professor, Department of Geography, Syracuse University, Syracuse, NY
1997-1999, Postdoctoral Associate, Department of Ecology and Evolutionary Biology, Program in Biogeochemistry and Environmental Change, Cornell University, Ithaca, NY
1991-1997, Graduate Assistant (research & teaching), Department of Environmental Sciences, University of Virginia, Charlottesville, VA
1994-1997, Physical Scientist, United States Geological Survey, Menlo Park, CA
1991-1994, Hydrologic Technician, United States Geological Survey, Menlo Park, CA
1989 Science & Engineering Intern, Battelle - Pacific Northwest National Laboratory, United States Department of Energy, Richland, WA

Career Interruptions: 2005-2006 and 2011-12 (2 semesters each)

HONORS

Cited among "Top 60 Papers from the First 60 Years of L&O" for McKnight et al. 2002
Visiting Associate Professor (on sabbatical), Cornell University, Department of Earth & Atmospheric Sciences, Ithaca, NY
Guest Professor, Swedish Univ. of Agricultural Sciences, Department of Aquatic Sciences & Assessment, Uppsala, Sweden
American Water Resources Association's Boggess Award for best paper for Alexander et al. 2007
Berkeley Presidential Chair Fellows Program
Elected Chair, Gordon Research Conference on Catchment Science: Interactions of Hydrology, Biology, & Geochemistry
Maury Environmental Sciences Prize, University of Virginia
Outstanding Student Presentation, American Geophysical Union hydrology section
Du Pont Fellowship, Department of Environmental Sciences, University of Virginia
Society of Sigma Xi, scientific research honor society, University of Virginia
Sigma Gamma Epsilon, geosciences honor society, Beta Kappa chapter
Gamma Theta Upsilon, geography honor society, Alpha Tau chapter
Valedictorian, Penns Valley Area High School, Spring Mills, PA

TEACHING

Penn State University, University Park, PA (2008-present). Courses in the Department of Ecosystem Science & Management: *Watershed Hydrology & Management* (2009-2017); *Water & Watersheds* (2009); *Concentration-Discharge Relationships in Watersheds* (2011); *Headwater Streams* (2012); *Current Topics in Water Resources Research* (2013); *Watershed Management Lab* (2011, 2015, 2016); *Research Integrity and Communications* (2016, 2017).

University of California, Berkeley, CA (2005-2007). Courses in the Department of Environmental Science, Policy & Management: *Watershed Hydrology; Forests and Water; Research Concepts and Approaches in Environmental Science, Policy & Management.*

State University of New York, Syracuse, NY (2000-2004). Courses in the Department of Forest and Natural Resources Management: *Watershed Hydrology; Forest Hydrology; Hydrological Techniques; Watershed Ecology; Current Topics in Hydrology; Current Topics in Biogeochemistry.*

PUBLICATIONS

Total publications: 82 peer-reviewed (with 58 journal articles plus 24 books, chapters, and scientific community reports; advisees underlined)
Citation Indices: H-Index 38; and 12,832 citations (from Google Scholar, accessed May 2017)

Publications, continued

1. Iavorivska L, **EW Boyer**, JW Grimm, MP Miller, DR DeWalle, KJ Davis, and MW Kaye. Variability of dissolved organic carbon in precipitation during storms at the Shale Hills Critical Zone Observatory. Hydrological Processes. 2017;1–16. doi: 10.1002/hyp.11235.
2. Iavorivska L, **EW Boyer**, and JW Grimm (2017). Wet Atmospheric Deposition of Organic Carbon: An Under-Reported Source of Carbon to Watersheds in the Northeastern USA. *Journal of Geophysical Research - Atmospheres,* 122, doi: 10.1002/2016JD026027.
3. Risch M, D Gay, J DeWild, L Zhang, **E Boyer**, and D Krabbenhoft (2017). Atmospheric Mercury Deposition to Forests in the Eastern USA. *Environmental Pollution* 228(8-18), doi: 10.1016/j.envpol.2017.05.004.
4. Benway, H, S Alin, **E Boyer,** WJ Cai, P Coble, J Cross, M Friedrichs, M Goñi, P Griffith, M Herrmann, S Lohrenz, J Mathis, G McKinley, R Najjar, C Pilskaln, S Siedlecki, R Smith (2016). A Science Plan for Carbon Cycle Research in North American Coastal Waters. Report of the U.S. Carbon Cycle Science Program, Ocean Carbon and Biogeochemistry Program; Coastal Carbon Synthesis (CCARS) community workshop, August 19-21, 2014, 84pp., doi: 10.1575/1912/7777.
5. Campbell, JL, MA Vadeboncoeur, H Asbjornsen, MB Green, MB Adams, **EW Boyer** (2016). Evaluating biological and physical drivers of evapotranspiration trends at northeastern U.S. watersheds. pp. 229-231 in Stringer, C.E.; Krauss, K.W.; Latimer, J.S., eds. Headwaters to estuaries: advances in watershed science and management: Proceedings of the Fifth Interagency Conference on Research in the Watersheds. March 2-5, 2015, North Charleston, South Carolina. Tech. Rep. SRS-211. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 302 p.
6. DeWalle DR, **EW Boyer,** and AR Buda (2016). Exploring Lag Times Between Monthly Atmospheric Deposition and Stream Chemistry in Appalachian Forests Using Cross Correlation. *Atmospheric Environment,* doi: 10.1016/j.atmosenv.2016.09.015.
7. Dzombak, DA, SW Almond, ES Bair, P Bloomfield, SR Bohlen, **EW Boyer,** SL Brantley, JV Bruckner, TL Davis, JJ DeGeorge, J Ducoste, S Dunn-Norman, KB Ensor, EM Faustman, JV Fontana, DJ Goode, BD Honeyman, WR Hufford, RF Jack, DS Kaback, AA Li, DN Malouta, CT Miller, LJ Pyrak-Nolte, SJ Randtke, JN Ryan, JE Saiers, AN Tutuncu, PK Westerhoff, TM Young, and E Hanlon (2016). Review of EPA's draft Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources. U.S. Environmental Protection Agency, EPA-SAB-16-005.
8. Iavorivska L, **EW Boyer,** and DR DeWalle (2016). Atmospheric Deposition of Organic Carbon via Precipitation. *Atmospheric Environment,* doi: 10.1016/j.atmosenv.2016.06.006.
9. Iavorivska L, **EW Boyer,** MP Miller, MG Brown, T Vasilopoulos, JD Fuentes, and CJ Duffy (2016). Atmospheric Inputs of Organic Matter to a Forested Watershed: Variations from Storm to Storm over the Seasons. *Atmospheric Environment,* doi: 10.1016/j.atmosenv.2016.10.002.
10. Miller MA, **EW Boyer,** DM McKnight, MG Brown, RS Gabor, CT Hunsaker, L Iavorivska, S Inamdar, DW Johnson, LA Kaplan, H Lin, WH McDowell, and JN Perdrial (2016). Variation of Organic Matter Quantity and Quality in Streams at Critical Zone Observatory Watersheds. *Water Resources Research,* 52, doi: 10.1002/2016WR018970.

Publications, continued

11. Eklöf KJ, A Kraus, M Futter, J Schelker, M Meili, **EW Boyer,** and KH Bishop (2015). A Parsimonious Model for Simulating Total Mercury and Methylmercury in Boreal Streams using Riparian Flow Paths and Seasonality. *Environmental Science and Technology,* 7;49(13):7851-9. doi: 10.1021/acs.est.5b00852.
12. Hytteborn JK, J Temnerud, RB Alexander, **EW Boyer**, MN Futter, M Froberg, J Dahne, and KH Bishop (2015). Patterns and Predictability in the Intra-Annual Organic Carbon Variability across the Boreal and Hemiboreal Landscape. *Science of the Total Environment,* 520:260-269. doi: 10.1016/j.scitotenv.2015.03.041.
13. Herrmann M, RG Najjar, WM Kemp, RB Alexander, **EW Boyer,** WJ Cai, PC Griffith, KD Kroeger, SL McAllister, RA Smith (2014). Net Ecosystem Production and Organic Carbon Balance of U.S. East Coast Estuaries: A Synthesis Approach. Global Biogeochemical Cycles, 29: 96-111. doi: 10.1002/2013GB004736.
14. Sebestyen SD, J Shanley, **EW Boyer,** C Kendall, and D Doctor. (2014). Coupled hydrological and biogeochemical processes controlling variability of nitrogen species in streamflow during autumn in an upland forest. *Water Resources Research,* doi: 10.1002/2013WR013670.
15. Williams MR, AR Buda, HA Elliott, J Hamlett, **EW Boyer**, and JP Schmidt. (2014). Groundwater Flow Path Dynamics and Nitrogen Transport Potential in the Riparian Zone of an Agricultural Headwater Catchment. *Journal of Hydrology.* doi: 10.1016/j.jhydrol.2014.02.033.
16. Baron JS, EK Hall, BT Nolan, JC Finlay, ES Bernhardt, JA Harrison, F Chan, and **EW Boyer.** (2013). The interactive effects of excess reactive nitrogen and climate change on aquatic ecosystems and water resources of the United States. *Biogeochemistry,* DOI 10.1007/s10533-012-9788-y.
17. Brubaker KM, WL Myers, PJ Drohan, DA Miller, and **EW Boyer**. (2013). The Use of LiDAR Terrain Data in Characterizing Surface Roughness and Microtopography. *Applied and Environmental Soil Science,* vol. 2013, Article ID 891534, 13p, 2013. Doi:10.1155/2013/891534.
18. Houlton BZ, **E Boyer**, A Finzi, J Galloway, A Leach, D Liptzin, J Melillo, TS Rosenstock, D Sobota, AR Townsend. (2013). Intentional versus unintentional nitrogen Use in the United States: trends, efficiency and implications. *Biogeochemistry,* DOI 10.1007/s10533-012-8901-5.
19. Baron JS, EK Hall, BT Nolan, JC Finlay, ES Bernhardt, JA Harrison, F Chan, and **EW Boyer** (2012). The Interactive Effects of Human-Derived Nitrogen Loading and Climate Change on Aquatic Ecosystems of the United States. Chapter 5 (pp. 107-136) in: EC Suddick & EA Davidson, eds., The Role of Nitrogen in Climate Change and the Impacts of Nitrogen-Climate Interactions on Terrestrial and Aquatic Ecosystems, Agriculture and Human Health in the United States: A technical report submitted to the U.S. National Climate Assessment, North American Nitrogen Center of the International Nitrogen Initiative.
20. **Boyer EW,** BR Swistock, J Clark, M Madden, and DE Rizzo. The Impact of Marcellus Gas Drilling on Rural Drinking Water Supplies (2012). Report, Center for Rural Pennsylvania, 28pp.

Publications, continued

21. Houlton BZ, **EW Boyer,** A. Finzi, J. Galloway, A. Leach, D. Liptzin, J. Melillo, T. Rosenstock, D. Sobota, and A. R. Townsend (2012). The U.S. Nitrogen Inventory: N-use Efficiency among Economic Sectors and N x Climate Risks Nationwide. Chapter 2 (pp. 15-40) in: EC Suddick & EA Davidson, eds., The Role of Nitrogen in Climate Change and the Impacts of Nitrogen-Climate Interactions on Terrestrial and Aquatic Ecosystems, Agriculture and Human Health in the United States: A technical report submitted to the U.S. National Climate Assessment, North American Nitrogen Center of the International Nitrogen Initiative.
22. Cory RM, **EW Boyer,** DM McKnight (2011). Spectral Methods to Advance Understanding of Dissolved Organic Carbon Dynamics in Forested Catchments. Pp. 115-135 (Chapter 6) in: D.F. Levia et al. (eds.), Forest Hydrology and Biogeochemistry: Synthesis of Past Research and Future Directions, Ecological Studies 216, DOI 10.1007/978-94-007-1363-5_6.
23. Doering, O, JN Galloway, TL Theis, V Aneja, **E Boyer,** KC Cassman, EB Cowling, RR Dickerson, W Herz, DL Hey, R Kohn, JS Lighty, W Mitsch, W Moomaw, A Mosier, H Paerl, B Shaw, P Stacey, T Armitage, A Nugent, and K White (2011). Reactive Nitrogen in the United States: An Analysis of Inputs, Flows, Consequences, and Management Options - A Report of the Science Advisory Board. U.S. Environmental Protection Agency, EPA-SAB-11-013, 172p.
24. Dzombak, DA, G Alexeeff, T Ballestero, M Benjamin, M Boufadel, **E Boyer,** D Burnett, TL Davis, S Dunn-Norman, JP Giesy, J Griffiths, P Gschwend, CM Harris, NK Kim, CM Lee, D Patten, S Randtke, D Reible, C Schreppel, G Thyne, J VanBriesen, R Vidic, and E Hanlon (2011). Review of EPA's Draft Hydraulic Fracturing Study Plan. U.S. Environmental Protection Agency, EPA-SAB-11-012, 89p.
25. Patten D, **E Boyer**, W Clements, J Dinger, G Geidel, K Hartman, R Hilderbrand, A Huryn, L Johnson, T LaPoint, SN Luoma, D McLaughlin, M Newman, T Petty, E Rankin, D Soucek, B Sweeney, P Townsend, R Warner, and E Hanlon (2011). Review of EPA's Draft Report on Aquatic Ecosystem Effects of Mountaintop Mining and Valley Fills. U.S. Environmental Protection Agency, EPA-SAB-11-005, 89p.
26. Patten D, **E Boyer**, W Clements, J Dinger, G Geidel, K Hartman, R Hilderbrand, A Huryn, L Johnson, T LaPoint, SN Luoma, D McLaughlin, M Newman, T Petty, E Rankin, D Soucek, B Sweeney, P Townsend, R Warner, and S Sanzone (2011). Review of Field-Based Aquatic Life Benchmark for Conductivity in Central Appalachian Streams. U.S. Environmental Protection Agency, EPA-SAB-11-006, 48p.
27. Fernandez IJ, Hammitt JK, **EW Boyer**, CT Driscoll, C Goodale, KG Harrison, A Legge, S Polasky, and R Stahl (2010). Review of Ecological Effects for the Second Section 812 Prospective Study of Benefits and Costs of the Clean Air Act. U.S. Environmental Protection Agency, EPA-COUNCIL-10-003, 32 p.
28. Meyer JL, R Allen-King, EF Benfield, GA Burton, PM Chapman, L Conquest, W Landis, J Oris, A Rodewald, J Sanders, T Thompson, V Bierman, **E Boyer**, M David, D McLaughlin, PL Mulholland, AN Sharpley, and T Armitage (2010). SAB Review of Empirical Approaches for Nutrient Criteria Derivation. U.S. Environmental Protection Agency, EPA-SAB-10-006, 67p.

Publications, continued

29. Miller M, BE Simone, DM McKnight, RM Cory, MW Williams, and **EW Boyer** (2010). New light on a dark subject: comment. *Aquatic Sciences* 72:269–275, DOI 10.1007/s00027-010-0130-2.
30. Shih JS, RB Alexander, RA Smith, **EW Boyer**, GE Schwarz, and S Chung (2010). An initial SPARROW model of land use and in-stream controls on total organic carbon in streams of the conterminous United States. U.S. Geological Survey Open-File Report 2010–1276, 22 p.
31. Alexander RB, JF Böhlke, **EW Boyer**, M David, JW Harvey, PJ Mulholland, SP Seitzinger, CR Tobias, C Tonitto, W Wollheim (2009). Dynamic modeling of nitrogen losses in river networks unravels the coupled effects of hydrological and biogeochemical processes. *Biogeochemistry*, DOI 10.1007/s10533-008-9274-8.
32. Burns DA, **EW Boyer**, EM Elliott, and C Kendall (2009). Sources of nitrate and processes that affect its transformation and transport in stream watersheds draining varying land uses: evidence from dual isotope analysis. *Journal of Environmental Quality*, 38:1149–1159, doi:10.2134/jeq2008.0371.
33. Campbell, JL, LE Rustad, **EW Boyer,** SF Christopher, CT Driscoll, IJ Fernandez, PM Groffman, D Houle, J Kiekbusch, AJ Magill, MJ Mitchell, and SV Ollinger (2009). Consequences of climate change for biogeochemical cycling in forests of northeastern North America. *Canadian Journal of Forest Research* 39: 264-284.
34. Golden HE and **EW Boyer** (2009). Contemporary estimates of atmospheric nitrogen deposition to the watersheds of New York state, USA. *Environmental Monitoring and Assessment*, DOI 10.1007/s10661-008-0438-8, 155:319-339.
35. Golden HE, **EW Boyer,** MG Brown, ST Purucker, and RH Germain (2009). Spatial variability of nitrate concentrations under varying seasonal conditions in tributaries to Cayuga Lake Watershed, New York, USA. *Journal of the American Water Resources Association*, doi: 10.1111/j.1752-1688.2009.00338.x.
36. Elliott EM, C Kendall, **EW Boyer**, DA Burns, G Lear, HE Golden, A Bytnerowicz, TJ Butler, and R Glatz (2009). Dual nitrate isotopes in dry deposition: Utility for partitioning NO_x source contributions to landscape nitrogen deposition. *Journal of Geophysical Research – Biogeosciences*, Vol 114, G04020, doi: 10.1029/2008JG000889.
37. Sebestyen SD, **EW Boyer,** and JB Shanley (2009). Responses of stream nitrate and DOC loadings to hydrological forcing and climate change in an upland forest of the northeastern United States *Journal of Geophysical Research – Biogeosciences*, Vol. 114, G02002, doi:10.1029/2008JG000778.
38. Sebestyen SD, JB Shanley, and **EW Boyer** (2009). Documenting effects of atmospheric pollutants on stream chemistry using high-frequency sampling. P. 171-175 in RT Webb & DJ Seemens (Eds.), USGS Scientific Investigations Report 2009-5049, Planning for an Uncertain Future—Monitoring, Integration, and Adaptation.
39. Alexander RB, RA Smith, GE Schwarz, **EW Boyer**, JV Nolan, & JW Brakebill (2008). Differences in sources and recent trends in phosphorous and nitrogen delivery to the Gulf of Mexico from the Mississippi and Atchafalaya River Basins. *Environmental Science & Technology*, 42(3), 822–830, doi: 10.1021/es0716103.
40. **Boyer EW** & RW Howarth (2008). Nitrogen fluxes from rivers to the coastal oceans. Chapter 36, p. 1565-1584, in: Capone DG, DA Bronk, MR Mulholland, and EJ Carpenter (eds.), Nitrogen in the Marine Environment, 2nd edition, Academic Press, San Diego, 1668 p.

Publications, continued

41. Christopher SF, MJ Mitchell, MR McHale, **EW Boyer**, DA Burns, & C Kendall (2008). Factors controlling nitrogen release from two forested catchments with contrasting hydrochemical responses. *Hydrological Processes,* 22:46-62, doi: 10.1002/hyp.6632.
42. Doctor D, C Kendall, S Sebestyen, J Shanley, N Ohte, **E Boyer** (2008). Carbon isotope fractionation of dissolved inorganic carbon due to outgassing of carbon dioxide from a headwater stream. *Hydrological Processes*, 22(14):2410-2412, DOI 10.1002/hyp.6833.
43. Golden HE, **EW Boyer,** MG Brown, EM Elliott, and DK Lee (2008). Simple approaches for measuring dry atmospheric nitrogen deposition inputs to watersheds. *Water Resources Research*, 44, doi:10.1029/2008WR006952.
44. Sebestyen SD, **EW Boyer**, JB Shanley, C Kendall, DH Doctor, GR Aiken, and N Ohte (2008). Sources, transformations, and hydrological processes that control stream nitrate and dissolved organic matter concentrations during snowmelt in an upland forest. *Water Resources Research*, 44, W12410, doi:101029/2008WR006983.
45. Alexander RB, **EW Boyer,** RA Smith, GE Schwarz, & RB Moore (2007). The role of headwater streams in downstream water quality. *Journal of the American Water Resources Association*, 43(1):41-59. *Recipient of AWRA's 2007 Boggess Award for best paper.*
46. Elliott EM, C Kendall, SD Wankel, DA Burns, **EW Boyer**, K Harlin, DJ Bain, & TJ Butler (2007). Nitrogen isotopes as indicators of NO_x source contributions to atmospheric nitrate deposition across the Midwestern and Northeastern United States. *Environmental Science & Technology*, 41 (22), 7661 -7667, doi: 10.1021/es070898t.
47. Borbor MJ, **EW Boyer**, CA Hall, & WH McDowell (2006). Nitrogen and phosphorus budgets for a tropical agricultural watershed impacted by extensive export crops: Guayas, Ecuador. *Biogeochemistry*, 79:135-161, doi: 10.1007/s10533-006-9009-7.
48. **Boyer EW**, RB Alexander, WJ Parton, CS Li, K Butterbach-Bahl, SD Donner, RW Skaggs, & S Del Grosso. (2006). Modeling denitrification in terrestrial and aquatic ecosystems at regional scales. *Ecological Applications*, 16(6): 2123–2142.
49. **Boyer EW**, RW Howarth, JN Galloway, FJ Dentener, PA Green, and CJ Vörösmarty (2006). Riverine nitrogen export from the continents to the coasts. *Global Biogeochemical Cycles*, 20, GB1S91, doi:10.1029/2005GB002537.
50. Filoso S, LA Martinelli, RW Howarth, **EW Boyer**, & FJ Dentener (2006). Human activities changing the nitrogen cycle in Brazil. *Biogeochemistry*, 79:61-89, doi: 10.1007/s10533-006-9003-0.
51. Howarth RW, R Marino, DP Swaney, & **EW Boyer** (2006). Wastewater and watershed influences on primary productivity and oxygen dynamics in the lower Hudson River estuary. P. 121-139 in: J. Levinton & J.R. Waldman (eds.), The Hudson River Estuary, Cambridge University Press.
52. Howarth RW, DP Swaney, **EW Boyer,** R Marino, N Jaworski, & C Goodale (2006). The influence of climate on average nitrogen export from large watersheds in the Northeastern United States. *Biogeochemistry*, 79:163-186, doi: 10.1007/s10533-006-9010-1.

Publications, continued

53. Driscoll CT, **EW Boyer**, M Castro, C Goodale, KG Harrison, S Ollinger, R Stahl, T Cameron, L Chestnut, and H Stallworth (2005). Advisory on Plans for Ecological Effects Analysis in the Analytical Plan for EPA's Second Prospective Analysis – Benefits and Cost of the Clean Air Act, 1990 – 2020. U.S. Environmental Protection Agency, Ecological Effects Subcommittee, EPA Advisory Council on Clean Air Compliance Analysis, EPA-SAB-COUNCIL-ADV-05-001), 52p.
54. Van Drecht G, AF Bouwman, **EW Boyer**, P Green, & S Seibert (2005). A comparison of global spatial distributions of nitrogen inputs for nonpoint sources and effects on river nitrogen export. *Global Biogeochemical Cycles,* 19, GB4S06, doi: 10.1029/2005GB002454
55. **Boyer EW**, RW Howarth, JN Galloway, FJ Dentener, P Green, C Vörösmarty, C Cleveland, & GP Asner (2004). Current nitrogen inputs to world regions. In AR Mosier, K Syers & JR Freney (eds.), Agriculture and the nitrogen cycle: assessing the impact of fertilizer use on food production and the environment, p. 221-230. Washington, D.C. Island Press.
56. Galloway JN, FJ Dentener, DG Capone, **EW Boyer**, RW Howarth, SP Seitzinger, GP Asner, C Cleveland, P Green, E Holland, DM Karl, AF Michaels, JH Porter, A Townsend & C Vörösmarty (2004). Nitrogen Cycles: Past, Present and Future. *Biogeochemistry* 70: 153-226.
57. Green PA, CJ Vörösmarty, M Meybeck, JN Galloway, BJ Peterson, and **EW Boyer** (2004). Pre-industrial and contemporary fluxes of nitrogen through rivers: a global assessment based on typology. *Biogeochemistry 68(1):71-105.*
58. Ohte N, SD Sebestyen, JB Shanley, DH Doctor, C Kendall, SD Wankel, and **EW Boyer** (2004). Tracing sources of nitrate in snowmelt runoff using a high-resolution isotopic technique. *Geophysical Research Letters,* 31(L21506), doi:10.1029/2004GL020908.
59. Peoples MB, **EW Boyer**, KWT Goulding, P Heffer, VA Ochwoh, B Vanlauwe, S Wood, K Yagi, & O Van Cleemput (2004). Pathways of nitrogen loss and their impacts on human health and the environment. In AR Mosier, K Syers & JR Freney (eds.), Agriculture and the nitrogen cycle: assessing the impact of fertilizer use on food production and the environment, p. 53-69. Washington, D.C. Island Press.
60. Driscoll CT, J Aber, **EW Boyer**, M Castro, C Cronan, CL Goodale, C Hopkinson, KF Lambert, G Lawrence, S Ollinger, & DR Whitall (2003). Nitrogen pollution: From the sources to the sea. Hubbard Brook Research Foundation, Science Links Publication Vol. 1, No. 2.
61. Driscoll C, D Whitall, J Aber, **E Boyer**, M Castro, C Cronan, C Goodale, P Groffman C Hopkinson, K Lambert, G Lawrence, S Ollinger (2003). Nitrogen pollution in the northeastern United States: Sources, effects and management options. *Bioscience* 53(4):357-374.
62. Driscoll C, D Whitall, J Aber, **E Boyer**, M Castro, C Cronan, C Goodale, P Groffman C Hopkinson, K Lambert, G Lawrence, S Ollinger (2003). Nitrogen pollution: sources and consequences in the U.S. northeast. *Environment* 45(7):8-22.
63. Grigg N, **E Boyer**, J Dozier, N Grimm, V Lakshmi, U Lall, D McLaughlin, Y Reinfelder, D Tarboton, C Vörösmarty (2003). A national center for hydrologic synthesis: scientific objectives, structure, and implementation. Consortium of Universities for the Advancement of Hydrologic Sciences, Inc. Technical report #5.

Publications, continued

64. Grimm, NB, SE Gergel, WH McDowell, **EW Boyer**, CL Dent, PM Groffman, SC Hart, JW Harvey, CA Johnston, E Mayorga, M McClain, & G Pinay (2003). Merging aquatic and terrestrial perspectives of nutrient biogeochemistry. *Oecologia* 442: 485–501.
65. McClain ME, **EW Boyer**, CL Dent, SE Gergel NB Grimm, PM Groffman, SC Hart, JW Harvey, CA Johnston, E Mayorga, WH McDowell, G Pinay (2003). Biogeochemical hot spots and hot moments at the interface of terrestrial and aquatic ecosystems. *Ecosystems* 6(4): 301-312.
66. Alexander RB, PJ Johnes, **EW Boyer** & RA Smith (2002). A comparison of methods for estimating the riverine export of nitrogen from large watersheds. *Biogeochemistry*, 57: 295-339.
67. **Boyer EW**, CL Goodale, NA Jaworski, & RW Howarth (2002). Anthropogenic nitrogen sources and relationships to riverine nitrogen export in the northeastern USA. *Biogeochemistry*, 57:137-169.
68. **Boyer EW** & RW Howarth, editors (2002). The Nitrogen Cycle at Regional to Global Scales. Kluwer Academic Publishers, 518 p.
69. Goodale CL, K Lajtha, KJ Nadelhoffer, **EW Boyer**, & N Jaworski (2002). Forest nitrogen sinks in large eastern U.S. watersheds: estimates from forest inventory and an ecosystem model. *Biogeochemistry*, 57:239-266.
70. Howarth RW, **EW Boyer**, W Pabich, & JN Galloway (2002). Nitrogen use in the United States from 1961 – 2000 and potential future trends. *Ambio*, 31(2):88-96.
71. Mayer B, **EW Boyer**, CA Goodale, NA Jaworski, N Van Breemen, RW Howarth, S Seitzinger, G Billen, K Lajtha, K Nadelhoffer, D Van Dam, LJ Hetling, M Nosall, K Paustian (2002). Sources of nitrate in rivers draining sixteen watersheds in the northeastern US: Isotopic Constraints. *Biogeochemistry*, 57:171-197.
72. McKnight DM, GM Hornberger, KE Bencala, & **EW Boyer** (2002). In-stream influences on dissolved organic carbon concentration and composition in an acidic and metal-enriched stream: a reach-scale reactive solute transport experiment. *Water Resources Research*, 381-412.
73. Seitzinger S, RV Styles, **EW Boyer**, RB Alexander, G Billen, RW Howarth, B Mayer, & N Van Breemen (2002). Nitrogen retention in rivers: Model development and application to watersheds in the eastern U.S. *Biogeochemistry*, 57:199-237.
74. Van Breemen N, **EW Boyer**, CL Goodale, NA Jaworski, K Paustian, SP Seitzinger, K Lajtha, B Mayer, D VanDam, RW Howarth, KJ Nadelhoffer, M Eve, & G Billen (2002). Where did all the nitrogen go? Fate of nitrogen inputs to large watersheds in the northeastern USA. *Biogeochemistry*, 57:267-293.
75. McKnight DM, **EW Boyer**, P Doran, PK Westerhoff, T Kulbe, & D Andersen (2001). Spectrofluorometric characterization of aquatic fulvic acid for determination of precursor organic material and general structural properties. *Limnology & Oceanography*, 46: 38-48. *Cited among "The Top 60 Papers from the First 60 Years of L&O"*
76. **Boyer EW** & CL Dent (2000). Towards an integration of hydrology and ecosystem ecology at regional scales. *Hydrological Processes*, 14, 2613-2615.
77. **Boyer EW**, GM Hornberger, KE Bencala, & DM McKnight (2000). Effects of asynchronous snowmelt on flushing of dissolved organic carbon: a mixing model approach. *Hydrological Processes*, 14, 3291-3308.

Publications, continued

78. **Boyer EW**, GM Hornberger, KE Bencala, & DM McKnight (1997). Response characteristics of DOC flushing in an alpine catchment. *Hydrological Processes*, 11, 1635-1647.
79. **Boyer EW**, GM Hornberger, KE Bencala, & DM McKnight (1996). Overview of a simple model describing variation of dissolved organic carbon in an upland catchment. *Ecological Modelling*, 86: 183-188.
80. **Boyer EW,** GM Hornberger, KE Bencala, & DM McKnight (1995). Variation of dissolved organic carbon during snowmelt in soil and streamwaters of two headwater catchments. In: Biogeochemistry of Seasonally Snow Covered Catchments, IAHS Publication No. 228: 303-312.
81. Hornberger GM & **EW Boyer** (1995). Recent advances in watershed modeling. *Reviews of Geophysics* 33: 949-958.
82. Hoover KA, MG Foley, PG Heasler, and **EW Boyer** (1991). Sub-grid scale characterization of channel lengths for use in catchment modeling. *Water Resources Research*, 27(11), 2865-2873.

SPONSORED RESEARCH PROJECTS

Principal Investigator (PI) or co-Investigator (co-I) on grants totaling $12,516,822 at Penn State since 2008, with 54% as PI and 46% as co-I.

Current Sponsored Projects (at the Pennsylvania State University)

1. (PI) EW Boyer. Pennsylvania Atmospheric Deposition Research Program. Pennsylvania Department of Environmental Protection.
2. (PI) EW Boyer. Mercury Deposition and Accumulation in the Great Lakes Region. U.S. Environmental Protection Agency Region 3 & the Pennsylvania Department of Environmental Protection.
3. (Co-I) EW Boyer, with J. Harvey (PI), J. Gomez-Velez, and D. Scott. Hot Spots and Moments in River Corridors: A Continental Scale Analysis of River Hydrogeomorphology and Cumulative Influence on Water Quality. U.S. National Science Foundation and U.S. Geological Survey, John Wesley Powell Center for Analysis and Synthesis.
4. (PI) EW Boyer. Pennsylvania Water Resources Research Center Administration & Outreach Programs. U.S. Geological Survey 104B.
5. (Co-I) EW Boyer with J Shortle (PI), R Brooks, D Beegle, C Duffy, H Karsten, A Kemanian, D Miller, R Ready, and others. Center for Integrated Multi-Scale Nutrient Pollution Solutions. U.S. Environmental Protection Agency.

PROFESSIONAL SERVICE

Current Service to the Scientific Community

1. American Geophysical Union:
   - Hydrology Section, Water & Society Technical Committee (2014-present)
   - Hydrology Section, EcoHydrology Technical Committee (2017-present)
2. Consortium of Universities for the Advancement of Hydrological Sciences, Inc.:
   - Co-lead Penn State University Representative (2014-present)
   - Board of Directors (elected 2016 for 2017-2019 term)
3. Editorial Boards:
   - *Hydrological Processes,* Associate Editor (2015-present)
   - *Wiley Interdisciplinary Reviews: Water,* Associate Editor (2016-present)
4. Global Environment Facility / United Nations Environmental Program Project, Towards the International Nitrogen Management System
   - Co-lead (with Wim DeVries) of Activity 2.1, Quantifying Nitrogen flows, threats, and benefits at global and regional scales (2017-present)
5. National Atmospheric Deposition Program *Executive Committee* (2008-present)
6. Peer reviewer for *many* scientific journal articles, proposals, and agency reports. Reviews completed thus far in 2017: *Hydrological Processes* (2); *Limnology & Oceanography* (1); *Scientific Data – Nature* (1); *Water Resources Research* (2); *Wiley Interdisciplinary Reviews -Water* (1).
7. Pennsylvania Sea Grant External Advisory Council (2013-present)
8. Spring Creek Water Resources Monitoring Project Advisory Committee (2014-present)
9. Universities Council on Water Resources:
   - Lead Penn State University Representative (2008-present)
   - Board of Directors (2017-2019)
   - Warren Hall Medal Committee (2017-18)
   - Friends of UCOWR Medal Committee (2017-18)
10. U.S. Environmental Protection Agency:
   - Clean Air Scientific Advisory Committee: Secondary National Ambient Air Quality Standards Review Panel for NO_x and SO_x (2015-present)
   - Science Advisory Board: Ecological Processes and Effects Committee (2016-present)

Completed Service to the Scientific Community

1. American Geophysical Union:
   - Hydrology section *Water Quality* technical committee (2000-2010) and elected committee Chair (2008-2010)
   - Hydrology Section *Horton Research Grant* Committee (2010-2012)
   - *Journal of Geophysical Research – Biogeosciences,* Associate Editor (2009-2012)
   - James B. MacElwane Medal Committee for significant contributions to the geophysical sciences by an early career scientist (2013-2014)
2. Association for the Sciences of Limnology & Oceanography, John Martin Award committee for high impact paper in the aquatic sciences (2005-2008)
   - Lead nominator of a winning application: Boyer EW (2007). John Martin Award to Vannote et al. 1980, for the River Continuum Concept. Association for the Sciences of

Limnology and Oceanography, *Limnology & Oceanography Bulletin*, Volume 15(4):77.

3. American Water Resources Association:
   - Pennsylvania State Chapter, Board of Directors (2011-2016)
   - Lead Adviser of Student Chapters at: State University of New York at Syracuse (1999-2000) and Penn State University (2011-2016)
4. California Bay-Delta Authority, Determination of Sources of Organic Matter and Nutrients in the San Joaquin River Project, Advisory Committee (2006-2008)
5. Conference Planning Committees:
   - Gordon Research Conference on Catchment Science: Interactions of Hydrology, Biology and Geochemistry. Elected leader: Chair 2005-2007 (for meeting 2007 in New London, NH), and Vice Chair 2003-2005 (for meeting in 2005 in Waterville, ME)
   - International Ecohydrology Conference. Science advisory committee for conferences in May 2011 (Vienna, Austria), May 2013 (Rennes, France), and May 2015 (Vienna, Austria)
   - Joint UCOWR/NIWR/CUAHSI Conference on Water Systems, Science, and Society Under Global Change (2014). Organizing committee, Universities Council for Water Research. Assisted with fundraising and planning thematic sessions for conference at Tufts University, Medford, MA, June 2014
   - Pennsylvania Groundwater Symposium. Planning committee member, for meetings held in State College, PA May 2010 (200 attendees), May 2016 (250 attendees) and May 2017 (260 attendees)
6. Consortium of Universities for the Advancement of Hydrologic Sciences, Inc.:
   - Committee on River Basin Science: An Integrated Research Area (2005)
   - Standing Committee on Hydrologic Synthesis (2002-2003)
   - Lead Representative from State University of New York at Syracuse (2000-2004)
7. Swedish University of Agricultural Sciences (SLU), Uppsala, Sweden:
   - Assisted in establishing a collaborative agreement between SLU and Penn State University's College of Agricultural Sciences (2010-2012)
   - SLU Focus on Soils & Water Graduate Program, International Advisory Committee (2013-2015)
   - SLU Quantifying Weathering Rates for Sustainable Forestry Project (sponsored by FORMAS, with Uppsala University & Lund University), Science Advisory Committee (2012-2016)
8. U.S. Environmental Protection Agency, Clean Air Scientific Advisory Committee (CASAC):
   - Advisory Council on Clean Air Compliance Analysis; Ecological Effects Sub-Committee (2004-2005). Review of the Revised Analytical Plan for EPA's Second Prospective Analysis – Benefits and Costs of the Clean Air Act 1990-2020
   - Advisory Council on Clean Air Compliance Analysis; Ecological Effects Sub-Committee (2010-2011): Review of the Second Prospective Study Report of the Benefits and Cost of the Clean Air Act, Section on Effects of Air Pollutants on Ecological Resources
9. U.S. Environmental Protection Agency, Science Advisory Board (SAB):
   - Integrated Nitrogen Committee (2006-2011)
   - Ecological Processes and Effects Committee, Review of Nutrient Criteria Guidance (2009-2010)
   - Mountaintop Mines and Valley Fill Review Panel (2010-2011)

- Field-Based Aquatic Life Benchmark for Conductivity Review Panel (2010-2011)
- Hydraulic Fracturing Study Plan Review Panel (2011-2012)
- Hydraulic Fracturing Research Advisory Panel (2013-2016)

10. U.S. Global Change Research Program, North American Carbon Program Steering Group (2011-2013)
11. U.S. National Science Foundation:
    - Review Panelist
      - Earth Sciences Division (2009)
      - Graduate Education Division (2004, 2007)
    - Denitrification Research Coordination Network, Steering Committee (2005-2008)
12. Universities Council on Water Resources:
    - Lead Representative from State University of New York at Syracuse (2000-2004)
    - Board of Directors (2012-2015)

Communications Training

1. 2009-present (annually). Guidance by van Scoyoc Associates; toward Congressional Visits and Briefings. Toward discussions with legislators about the Water Resources Research Act, scientific research funding, and/or the role of water science/engineering/technology in advancing environmental problems. Washington, DC.
2. July 26, 2016. Broadening Your Impact: Using Social Media Tools to Network and Share Your Science (by Meg Gilley, COMPASS). Workshop of U.S. Carbon Cycle Science Program, Ocean Carbon and Biogeochemistry Program; Woods Hole, MA.
3. December 16-20, 2013. Discovering Leadership Workshop for Academic Faculty (by Clint Sidle & Chet Warzynski, Cornell), University Park, PA.
4. September 26-27, 2013. Communicating Complexity in a Rapidly Changing World: A COMPASS Science Communication Workshop (by Nancy Baron, author of "Escape from the Ivory Tower: A Guide to Making Your Science Matter"), State College, PA.

Professional Memberships

1. American Association for the Advancement of Science (AAAS)
2. American Chemical Society (ACS)
3. American Geophysical Union (AGU)
4. Association of Environmental Engineering and Science Professors (AEESP)
5. Association for the Sciences of Limnology and Oceanography (ASLO)
6. Ecological Society of America (ESA)

Session Organizer and Convener

1. Pennsylvania Groundwater Symposium: Groundwater and aquifer studies. State College, PA, May 2017.
2. ASLO, the sky is falling: Atmospheric deposition of all shapes and sizes and its influence on aquatic ecosystems around the world. Santa Fe, NM, June 2016.
3. Mid-Atlantic Water Conference, Green infrastructure management and design. Shepherdstown, WV, September 2014.
4. UCOWR/NIWR/CUAHSI, Hydraulic fracking. Medford, MA, June 2014.
5. AGU, Toward an inventory of nitrogen sources in the United States. San Fran., CA, Dec 2011.

6. ASLO, Sources, transport and cycling of nutrients in aquatic systems, Sante Fe, NM, June 2010.
7. AGU, Water quality of hydrologic systems. San Francisco, CA, December 2009.
8. NADP, Agricultural emissions and ecosystem effects. Saratoga Springs, NY, October 2009.
9. AGU, Sources, transport and cycling of nutrients in aquatic systems. San Francisco, CA, December 2008.
10. N2007 4th International Nitrogen Conference, Nitrogen balances in different regions of the world. Costa do Sauipe, Brazil, October 2007.
11. AGU, Water quality of hydrologic systems. San Francisco, CA, December 2005.
12. AGU, Hypoxia in the Mississippi Basin & other major ecosystems. New Orleans, LA, May 2005.
13. AGU, Water quality of hydrologic systems. San Francisco, CA, December 2004.
14. AGU, Water quality of hydrologic systems. San Francisco, CA, December 2003.
15. AGU, Nitrogen cycling in aquatic systems. San Francisco, CA, December 2003.
16. Estuarine Research Federation, Regional nitrogen inputs to the coastal zone. Seattle, WA; Sept. 2003.
17. AGU, Water quality of natural systems. Washington, DC, May 2002.
18. AGU, Human impacts on nitrogen cycling: science and policy. Boston, MA, May 2001.
19. AGU, Dissolved organic matter in surface & ground waters. San Fran., CA, December 2000.
20. ESA, Nitrogen transport & transformations: a global analysis. Spokane, WA; Aug. 1999.
21. AGU, Organic matter in aquatic systems. San Francisco, CA, December 1996.

PRESENTATIONS

Invited Presentations at Scientific Conferences
(41 in last 20 years, from 1997; with 3 plenary):

1. (Invited) Gomez-Velez J, JW Harvey, JJ Choi, D Scott, EW Boyer, and M KC. Connectivity Along the River Corridor: New Insights, Needs, and Future Avenues. H51L-01, American Geophysical Union, San Francisco, CA, December 2016.
2. (Invited) Iavorivska L, E Boyer, and J Grimm. Atmospheric Deposition of Organic Matter to Watersheds in the Northeastern United States: Rates and Temporal Variation. Association for the Sciences of Limnology and Oceanography Summer Meeting, Sante Fe, NM, June 2016.
3. (Invited) Boyer, EW. Opening Remarks. Pennsylvania Groundwater Symposium, State College, PA, May 2016.
4. (Invited) Boyer EW and L Fowler. Social Justice and Water Issues in the 21st Century. ED13A-3436, American Geophysical Union, San Francisco, CA, December 2014.
5. (Invited) Boyer EW, PJ Drohan, D Lawler, J Grimm, C Grant, KJ Eklöf, J Bennett, and MD Naber. Anthropogenic Mercury Accumulation in Watersheds of the Northern Appalachian Mountains. American Geophysical Union, San Francisco, CA, December 2014.
6. (Invited, Plenary) EW Boyer, R Alexander, J Needoba, and R Smith. Lateral transfers of carbon from terrestrial watersheds to the oceans: Rivers and groundwater. U.S. Carbon Cycle Science Program, Ocean Carbon and Biogeochemistry Workshop. Woods Hole Oceanographic Institution, Falmouth, MA, August 2014.

Invited Presentations, continued

7. (Invited) Alexander RB, EW Boyer, GE Schwarz, and RA Smith. Advances in Parameter and Uncertainty Quantification Using Bayesian Hierarchical Techniques with a Spatially Referenced Watershed Model. B24B-01, American Geophysical Union, San Francisco, CA, December 2013.
8. (Invited) Boyer EW. Riverine carbon loadings to the Gulf of Mexico. U.S. Carbon Cycle Science Program, Ocean Carbon and Biogeochemistry Program Workshop. Tampa, Florida, March 2013.
9. (Invited) EW Boyer, JN Galloway, and RB Alexander. A Nitrogen Inventory of Major Water Regions Across the USA as a Benchmark for Future Progress in Mitigating Nitrogen Pollution. B41H-08. Fall Meeting, American Geophysical Union, San Francisco, California, 5-9 Dec 2012.
10. (Invited) EW Boyer, RB Alexander; RA Smith; J Shih. Quantifying Organic Matter in Surface Waters of the United States and Delivery to the Coastal Zone. B34C-01. Fall Meeting, American Geophysical Union, San Francisco, California, 5-9 Dec 2012.
11. (Invited) BZ Houlton, EW Boyer, AC Finzi, JN Galloway, A Leach, D Liptzin, JM Melillo, T Rosenstock, DJ Sobota, AR Townsend. Nitrogen use efficiency in the U.S. economy: Towards mitigation of climate change impacts. B42C-06. Fall Meeting, American Geophysical Union, San Francisco, California, 5-9 Dec 2011.
12. (Invited, Plenary) Boyer EW. Fluxes of carbon from land to the ocean. Joint Meeting of North American Carbon Program (NACP) / U.S. Carbon Cycle Science Program, Ocean Carbon and Biogeochemistry Program. San Francisco, CA, December 11-12, 2010
13. (Invited) Sebestyen SD, JL Campbell, JB Shanley, A Pourmokhatarian, CT Driscoll, and EW Boyer. Stream nitrate responses to hydrological forcing and climate change in northern forests of the USA. Eos Trans. AGU, 90(52), Fall Meet. Suppl., Abstract H41J-02, Dec. 2009.
14. (Invited) Sebestyen SD, JB Shanley, B Pellerin, J Saraceno, GR Aiken, EW Boyer, DH Doctor (2009). Complex Catchment Processes that Control Stream Nitrogen and Organic Matter Concentrations in a Northeastern USA Upland Catchment. *Eos Trans. AGU, 90*(22), Joint Assembly Supplement, Abstract H31D-01, Toronto, Canada, May 2009.
15. (Invited) Sebestyen SD, JB Shanley, EW Boyer, and C Kendall (2009). Effects of Atmospheric Nitrate on an Upland Stream of the Northeastern USA. *Eos Trans. AGU, 90*(22), Joint Assembly Supplement, Abstract B32A-01, Toronto, Canada, May 2009.
16. (Invited) Alexander RB, RA Smith, GE Schwarz, EW Boyer, and JV Nolan. Recent Advances in Modeling Phosphorus and Nitrogen Delivery to the Gulf of Mexico and Implications for Managing Nutrients in the Mississippi River Basin. Eos Trans. AGU, 89*(53),* Fall Meet. Suppl., Abstract H23J-01. American Geophysical Union, San Francisco, CA, December 2008.
17. (Invited) Boyer EW. Modeling watershed nutrient fluxes and delivery to coastal waters. Terrestrial and Coastal Carbon Fluxes in the Gulf of Mexico. Workshop of U.S. Carbon Cycle Science Program, Ocean Carbon and Biogeochemistry Program. St. Petersburg, FL, May 2008.

Invited Presentations, continued

18. (Invited) Elliott EM, C Kendall, EW Boyer, DA Burns, K Harlin, G Lear, and SD Wankel. Distinguishing NO_x source contributions to wet and dry nitrate deposition in the United States using stable isotopes. EOS Trans. AGU, 88(52), Fall Meet. Suppl., Abstract B24A-03. American Geophysical Union, San Francisco, CA, December 2007.
19. (Invited) Boyer EW, S Filoso, and RW Howarth. Nitrogen inputs to landscapes around the world, with implications for water quality. N2007 4th International Nitrogen Conference, Costa do Sauipe, Brazil, October 2007.
20. (Invited) Shanley JB, SD Sebestyen, EW Boyer, and D Ross. Solute flushing: a hydro-biogeochemical phenomenon. American Geophysical Union, San Francisco, CA, December 2005.
21. (Invited) Shanley JB, SD Sebestyen, EW Boyer, and DS Ross. Contrasts in flushing patterns among solutes. Eos Transactions AGU, Fall Meeting Supplement 86(52), Abstract #H22B-03, American Geophysical Union, San Francisco, CA, December 2005.
22. (Invited) Boyer EW, RB Alexander, SD Sebestyen, RA Smith, and JB Shanley. Coupled hydrological and biogeochemical cycles affecting delivery of nitrogen to surface waters. American Geophysical Union, San Francisco, CA, December 2005.
23. (Invited) Alexander RB, EW Boyer, RA Smith, and GE Schwarz. The role of headwater streams in watershed-scale water quality, American Water Resources Association, Seattle, WA, November 2005.
24. (Invited) Boyer EW. It's all about connections: coupled hydrological and biogeochemical cycles in watersheds. Ecological Society of America, 90th Annual Meeting, Montréal, Canada, August 2005.
25. (Invited) Boyer EW, RB Alexander, SD Sebestyen. Apportioning sources of riverine nitrogen at multiple watershed scales. American Geophysical Union/North American Benthological Society, Joint Assembly, New Orleans, LA, May 2005.
26. (Invited) Boyer EW, SB Bricker, RA Smith, RB Alexander, and GB Schwarz. Nutrient enrichment of coastal receiving waters from catchments across the USA. American Geophysical Union/North American Benthological Society, Joint Assembly, New Orleans, LA, May 2005.
27. (Invited) Howarth RW, DP Swaney, RM Marino, N Bettez, and EW Boyer. Impacts on Nitrogen Delivery to Chesapeake Bay. American Association for the Advancement of Science, Washington, DC, February 2005.
28. (Invited) Alexander RB, RA Smith, GE Schwarz, and EW Boyer. Estimating nitrogen removal in rivers using spatially referenced modeling techniques, Association for the Sciences of Limnology and Oceanography, Salt Lake City, UT, February 2005.
29. (Invited) Boyer EW, RA Smith, RB Alexander, and GE Schwarz. Quantifying sources and fluxes of aquatic carbon in U.S. streams and reservoirs using spatially referenced regression models. American Geophysical Union, San Francisco, CA, December 2004.
30. (Invited) Boyer EW, RW Howarth, JN Galloway, FJ Dentener, C Cleveland, GP Asner, P Green, C Vörösmarty. Riverine nitrogen export from the world's watersheds. 3rd International Nitrogen Conference, Nanjing, China, October 2004.
31. (Invited) Howarth R, A Townsend, R Marino, G Gettel, N Bettez, and E Boyer. Do nitrogen transformations differ qualitatively across biomes? Ecological Society of America, Portland, OR, August 2004.

Invited Presentations, continued

32. (Invited) Howarth RW, R Marino, E Boyer, and D Swaney. Potential consequences of Climate Change on Delivery of Nutrients to Estuaries. Estuarine Research Federation Meeting, Seattle, WA, September 2003.
33. (Invited) Boyer EW, RW Howarth, and JN Galloway. Riverine nitrogen export from the world's watersheds. Estuarine Research Federation, Bi-Annual Meeting, Seattle, WA, September 2003.
34. (Invited) Boyer EW. Challenges and opportunities in estimating atmospheric deposition. Special session on tracking nutrient enrichment of water resources in the 21st century: challenges and opportunities for information management at the national level. Universities Council on Water Resources Conference, Washington, DC, July 2003.
35. (Invited) Boyer EW, CA Goodale RW Howarth, and N Van Breemen. Where did all the nitrogen go? Use of watershed-scale budgets to quantify nitrogen inputs, storages, and losses. American Geophysical Union, San Francisco, CA, December 2001.
36. (Invited) Boyer EW, CA Goodale, and RW Howarth. Relationships of anthropogenic nitrogen loading to riverine nitrogen export. 2nd International Nitrogen Conference, Potomac, MD, Oct. 2001.
37. (Invited) Boyer EW. Catchment-scale nitrogen budgets - new insights and questions regarding N sources, storage, and losses. Gordon Research Conference on Forested Catchments: Hydrological, Geochemical, and Biological Processes. Andover, NH, July 2001.
38. (Invited) Goodale CL, K Lajtha, KJ Nadelhoffer, EW Boyer, NA Jaworski. Forest nitrogen sinks in large eastern U.S. watersheds: inventory and modeled estimates. American Geophysical Union, Spring Meeting, Boston, MA, May 2001.
39. (Invited) Seitzinger SP, RV Styles, E Boyer, R Alexander, G Billen, R Howarth, B Mayer, N Van Breemen, and A Laursen. Nitrogen retention in rivers: measurements and model estimation. American Geophysical Union, Spring Meeting, Washington, DC, May 2000.
40. (Invited, Plenary) Boyer EW, R Alexander, V Bashkin, F Dentener, R Howarth, A Townsend, C Vörösmarty, and G Xing. Regional and landscape-scale nitrogen budgets. Ecological Society of America, Annual Meeting, Spokane, WA, August 1999.
41. (Invited) Boyer EW, GM Hornberger, KE Bencala, and DM McKnight. DOC patterns at the catchment scale. Association for the Sciences of Limnology and Oceanography, Aquatic Sciences Meeting, Sante Fe, NM, February 1997.

Contributed Presentations: (108 from 2007-2017)

Invited Presentations at Universities & Agencies: (20 from 2007-2017)

Invited Panelist or Discussion Leader (18):

1. Panelist, Meetings of Experts, *Use of Science at the Pennsylvania Department of Environmental Protection.* Sponsored by the National Research Council, Board on Earth Sciences & Resources. Harrisburg, PA, May 2016 and June 2016.
2. Panelist, *Science and Policy Interactions.* Cornell University, Biogeochemistry, Environmental Science, and Sustainability Fall Retreat, Ithaca, NY, September 2015.
3. Presenter and Discussion Leader, *Potential Impacts of Hydraulic Fracturing on Drinking Water Resources.* Marcellus Shale Gallery Conversations, Palmer Museum of Art, Penn

State University, October 2014.

4. Panelist, *Water Infrastructure Challenges in States of the Mid-Atlantic Region.* Mid-Atlantic Water Conference, Shepherdstown, WV, September 2014.
5. Panelist, *Ocean Acidification: The Underreported Crisis.* Pennsylvania State University, March 2014.
6. Discussion Leader, *Forests and Water Background for Landowners.* Delaware Highlands Conservancy, Women and their Woods, Camp Susque, Trout Run, PA, September 2013.
7. Presenter and Discussion Leader, *Visions of Water & Land in the Hudson River School.* Perspectives Unbound Gallery Talk, Palmer Museum of Art, Penn State University, November 2012.
8. Panelist, *Life after your PhD: How to Get a Job in Catchment Science*. Gordon-Kenan Research Seminar on Catchment Science: Interactions of Hydrology, Biology & Geochemistry, Lewiston, ME, 2011.
9. Panelist, *Tips for Publishing in the Geosciences.* Sponsored by the Earth Science Women's Network and the American Geophysical Union. AGU Fall Meeting, San Francisco, CA, December 2010.
10. Panelist, session on *Climate and Nitrogen Interactions with Hydrology and Water Quality*, and session on *Climate and Nitrogen Interactions with Acidification*, at U.S. Environmental Protection Agency Workshop on Interacting Effects of Climate and Nitrogen on Ecosystems and their Services. Arlington, VA, October 2010.
11. Panelist, *Issues at the Water & Energy Interface in Pennsylvania.* Mid-Atlantic Regional Water Resources Research Conference: The Water-Energy Nexus: A Necessary Synergy for the 21st Century. Shepherdstown, WV, November 18, 2008.
12. Discussion Leader, *Coupled Biogeochemical Cycles.* Gordon Research Conference on Catchment Science: Interactions of Hydrology, Biology, & Geochemistry, New London, NH, July 2007.
13. Panelist, *Watersheds.* New Directions in Rangelands, Forests, Watersheds, and Communities Conference, University of California, Berkeley, March 14, 2006.
14. Panelist, *Ecosystem Ecology at the Watershed Scale: Cycles Across the Terrestrial-Aquatic Divide.* Ecological Society of America, Montréal, Canada, August 9, 2005.
15. Discussion Leader, *Water Pollution.* Gordon Research Conference on Forested Catchments: Interactions of Hydrology, Biology, and Geochemistry. New London, NH, July 24, 2003.
16. Discussion Leader, session on watershed hydrology. Lake Ontario Interdisciplinary Science and Management Conference. Syracuse, NY, March 13, 2003.
17. Panelist, Session on nutrient pollution in coastal waters, sponsored by NOAA National Ocean Service. Coastal Zone 2001, Cleveland, OH, July 17, 2001.
18. Panelist, session on future needs for watershed science and management. Cornell University, Cayuga Lake Research Symposium. Ithaca, NY, October 12, 1999.

ADVISING

Current Students Advised:

1. Al Afghani, Bader (undergrad trainee), Penn State
2. Clune, John (doctoral) Penn State
3. Ferich, Andrea (dual-title masters) Penn State
4. Redder, Brian (masters and doctoral), Penn State

PhD Students Advised (6 completed):

1. Alexander, Richard. Ph.D. 2015, Penn State University. Current position: Hydrologist, National Water Quality Assessment Program, U.S. Geological Survey
2. Brubaker, Kristen, Ph.D. 2011, Penn State University. Current position: Assistant Professor, Hobart and William Smith Colleges, Geneva, NY
3. Golden, Heather E., Ph.D. 2007, State University of New York. Current position: Research Scientist, U.S. Environmental Protection Agency, Cincinnati, OH
4. Grant, Christopher J. Ph.D. 2012, Penn State University. Current position: Assistant Professor, Juniata College, Huntingdon, PA
5. Iavorivska, Lidiia, Ph.D. 2016, Penn State University. Current position: Postdoctoral Associate, Grand Valley State University, Annis Water Resources Institute, Muskegon, MI
6. Sebestyen, Stephen D. Ph.D. 2007, State University of New York. Current position: Research Scientist, U.S. Forest Service, Marcel experimental watersheds, MN

Masters Students Advised (12 completed):

1. Chowdhury, Amin. Master of Environmental Pollution Control 2016, Penn State University
2. Hawkins, Ruthanna. Master of Professional Studies 2003, State University of New York
3. Iavorivska, Lidiia. Master of Forest Resources 2010, Penn State University
4. Kozak, Justin. Master of Forest Resources 2010, Penn State University
5. Lawler, Dan. Master of Science 2014, Penn State University
6. Lee, Chia-Lun Nina. Master of Science 2001, State University of New York
7. McDonnell, Todd. Master of Professional Studies 2005, State University of New York
8. McNeill, Eric. Master of Professional Studies 2005, State University of New York
9. Reed, Brendan. Master of Science 2015, Penn State University
10. Tzilkowski, Sarah Gustafson. Master of Science 2013, Penn State University
11. Washlaski, Lynn. Master of Science 2003, State University of New York
12. Webber, James. Master of Science 2012, Penn State University

Undergraduate Researchers and Trainees (22 completed)

Postdoctoral Research Associates Advised (4 completed):

1. Eklöf, Karin. PSU, 2013-2014. Current position: Research Scientist, Swedish University of Agricultural Sciences, Uppsala, Sweden
2. Elliott, Emily. U.S. Geological Survey, 2004-2007 (co-adviser with Carol Kendall, USGS). Current position: Associate Professor, University of Pittsburgh
3. Liptzin, Dan. PSU, 2014-2015. Current position: Senior Instructor, University of Colorado, Denver, CO
4. Miller, Matt. PSU, 2008-2009. Current position: Research Scientist, National Water Quality Assessment Program at U.S. Geological Survey, Salt Lake City, UT

Student Advisee Honors and Awards (chronological order):

1. Sebestyen, Stephen. Albert L. Leaf Memorial Award for outstanding student. State University of New York, College of Environmental Science & Forestry, 2003.
2. Sebestyen, Stephen. Hydrology section Horton student research award. *American Geophysical Union* meeting, San Francisco, CA, December 2004.
3. Golden, Heather. Farnsworth Memorial Award for outstanding student. State University of New York, College of Environmental Science & Forestry, 2007.

4. Iavorivska, Lidiia. *Fulbright Scholar* fellowship, for work as international scholar at Penn State University, 2008-2010.
5. Ward, Adam. Outstanding student presentation award. *Association for the Sciences of Limnology and Oceanography* meeting, Santa Fe, NM, June 2010.
6. Gustafson, Sarah. Third place best student presentation award. *Soil Science Society of America* meeting, Long Beach, CA, November 2010.
7. Gustafson, Sarah. Outstanding student presentation award. *American Geophysical Union* meeting, San Francisco, CA, December 2011.
8. Webber, James. Best student presentation in the environmental chemistry section, and best overall student presentation. 15th Annual Environmental Chemistry Symposium, University Park, PA, March 2012.
9. Campbell, Brianne. First place best student presentation. 8th Annual Research Symposium, Tom Ridge Environmental Center, Erie, PA, November 2012.
10. Iavorivska, Lidiia. Second place best student presentation. 19th annual Graduate and Undergraduate Research Exposition, Penn State University, March 2013.
11. Tzilkowski, Sarah. Third place best presentation. 19th annual Graduate and Undergraduate Research Exposition, Penn State University, March 2013.
12. Lawler, Dan. Second place best student presentation. Susquehanna River Basin Commission Water Science Forum, Harrisburg, PA, October 2013.
13. Tzilkowski, Sarah. Third place best student presentation. Susquehanna River Basin Commission Water Science Forum, Harrisburg, PA, October 2013.
14. Britson, Aliana. Outstanding student poster presentation. Joint Aquatic Sciences Meeting -- *Association for the Sciences of Limnology & Oceanography, Society of Wetland Sciences, and Society for Freshwater Science* -- Portland, OR, May 2014.
15. Iavorivska, Lidiia. Student travel grant award. *American Geophysical Union* meeting, San Francisco, CA, December 2014.
16. Iavorivska, Lidiia. Second place best student presentation. 9th *International Conference on Acid Rain,* Rochester, NY, October 2015.
17. Redder, Brian. Selected participant in the international *São Paulo School of Advanced Science on Nitrogen Cycling, Environmental Sustainability and Climate Change,* for graduate students, sponsored by the *International Nitrogen Initiative,* University of São Paulo, Brazil, July 2016.
18. Iavorivska, Lidiia. Student travel grant award. *National Atmospheric Deposition Program, Scientific Symposium,* Sante Fe, NM, November 2016.
19. Iavorivska, Lidia. Outstanding student presentation award. *American Geophysical Union* meeting, San Francisco, CA, December 2016.
20. Redder, Brian. Selected participant in the national *Isotopes in Spatial Ecology and Biogeochemistry* short course, as part of *NSF-funded Inter-University Training for Continental-Scale Ecology Program,* University of Utah, June 2017.